Electronic Version

Stylesheet Version v1.1.1

Claims

[c1] We claim:

1.A method for controlling a steam turbine, the steam turbine having a first turbine subassembly and a second turbine subassembly both operably coupled to a rotor shaft for rotating the rotor shaft, the rotor shaft extending along an axis and being rotatably supported by a thrust bearing, the method comprising:

determining a magnitude of an axial force being applied by the rotor shaft against the thrust bearing; and

reducing an amount of steam being supplied to at least one of the first and second turbine assemblies when the magnitude of the axial force being applied against the thrust bearing exceeds a threshold value.

[c2] 2.The method of claim 1, wherein determining the magnitude of the axial force being applied against the thrust bearing comprises:

measuring a steam pressure being communicated to the first turbine subassembly to obtain a first pressure value;

measuring a steam pressure being communicated to the second turbine subassembly to obtain a second pressure value; and

calculating the magnitude of the axial force based on the first and second pressure values.

[c3] 3.The method of claim 1, wherein reducing the amount of steam being supplied to at least one of the first and second turbine assemblies comprises closing a first valve operably disposed within a first inlet conduit coupled to the first turbine subassembly to prevent steam from entering the first turbine subassembly.

[c4] 4.The method of claim 3, wherein reducing the amount of steam being supplied to at least one of the first and second turbine assemblies comprises closing a second valve operably disposed within a second inlet conduit coupled to the second turbine subassembly to prevent steam from entering the second turbine subassembly.

[c5] 5.A system for controlling a steam turbine, the steam turbine having a first turbine subassembly and a second turbine subassembly both operably coupled to a rotor shaft for rotating the rotor shaft, the rotor shaft extending along an axis and being rotatably supported by a thrust bearing, the system comprising:
a first pressure sensor operably coupled to a first conduit supplying steam to the first turbine subassembly, the first pressure sensor generating a first pressure signal indicative of a pressure of the steam in the first con-

duit;

a second pressure sensor operably coupled to a second conduit supplying steam to the second turbine sub-assembly, the second pressure sensor generating a sec-ond pressure signal indicative of a pressure of the steam in the second conduit;

first and second valves operably disposed in the first and second conduits, respectively; and

a computer operably coupled to the first and second pressure sensors and the first and second valves, the computer configured to calculate a magnitude of an axial force being applied against the thrust bearing by the ro-tor shaft based on the first and second pressure signals, the computer further configured to close at least one of the first and second valves when the magnitude of the axial force exceeds a predetermined threshold value.

[c6] 6.The system of claim 5, wherein the computer is further configured to determine first and second pressure values based on the first and second pressure signals, respec-tively, the computer is further configured to calculate the magnitude of the axial force based on the first and sec-ond pressure values.

[c7] 7.The system of claim 5, further comprising a steam generator operably coupled to the first and second con-duits.

[c8] 8.The system of claim 5, further comprising a steam condenser operably coupled to the second turbine sub-assembly.

[c9] 9.The system of claim 5, wherein the thrust bearing includes an aperture for receiving a rod portion of the rotor shaft, the rotor shaft having a flange portion disposed about the rod portion, the flange portion being proximate a surface of the thrust bearing.

[c10] 10.An article of manufacture, comprising:
a computer storage medium having a computer program encoded therein for controlling a steam turbine, the steam turbine having a first turbine subassembly and a second turbine subassembly both operably coupled to a rotor shaft for rotating the rotor shaft, the rotor shaft extending along an axis and being rotatably supported by a thrust bearing, the computer storage medium comprising:
code for determining a magnitude of an axial force being applied against the thrust bearing by the rotor shaft; and
code for reducing an amount of steam being supplied to at least one of the first and second turbine assemblies when the magnitude of the axial force exceeds a threshold value.

[c11] 11.The article of manufacture of claim 10, wherein the code for determining the magnitude of the axial force being applied against the thrust bearing comprises:

code for determining a steam pressure being communicated to the first turbine subassembly based on a first pressure signal;

code for determining a steam pressure being communicated to the second turbine subassembly based on a second pressure signal; and

code for calculating the magnitude of the axial force based on the steam pressure being received by the first turbine subassembly and the steam pressure being received by the second turbine subassembly.

[c12] 12.The article of manufacture of claim 10, wherein the code for reducing an amount of steam being supplied to at least one of the first and second turbine assemblies, comprises code for closing a first valve operably disposed within a first inlet conduit coupled to the first turbine subassembly to prevent steam from entering the first turbine subassembly.

[c13] 13.The article of manufacture of claim 12, wherein the code for reducing an amount of steam being supplied to at least one of the first and second turbine subassemblies, further comprises code for closing a second valve operably disposed within a second inlet conduit coupled

to the second turbine subassembly to prevent steam from entering the second turbine subassembly.